Implications and Opportunities under CORSIA for Turkey

Part III - *Supply and Demand*

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- **International** Demand and Supply Scenarios
- **Demand** for Offset Credits from Turkish Aircraft Operators
- **Supply** of Offset Credits from Turkish Carbon Projects

Note: **aircraft operators** from any country (including those from Turkey) are free to source their offset requirements from **any eligible carbon project in the world** (including those carbon projects in Turkey).

International and domestic supply and demand

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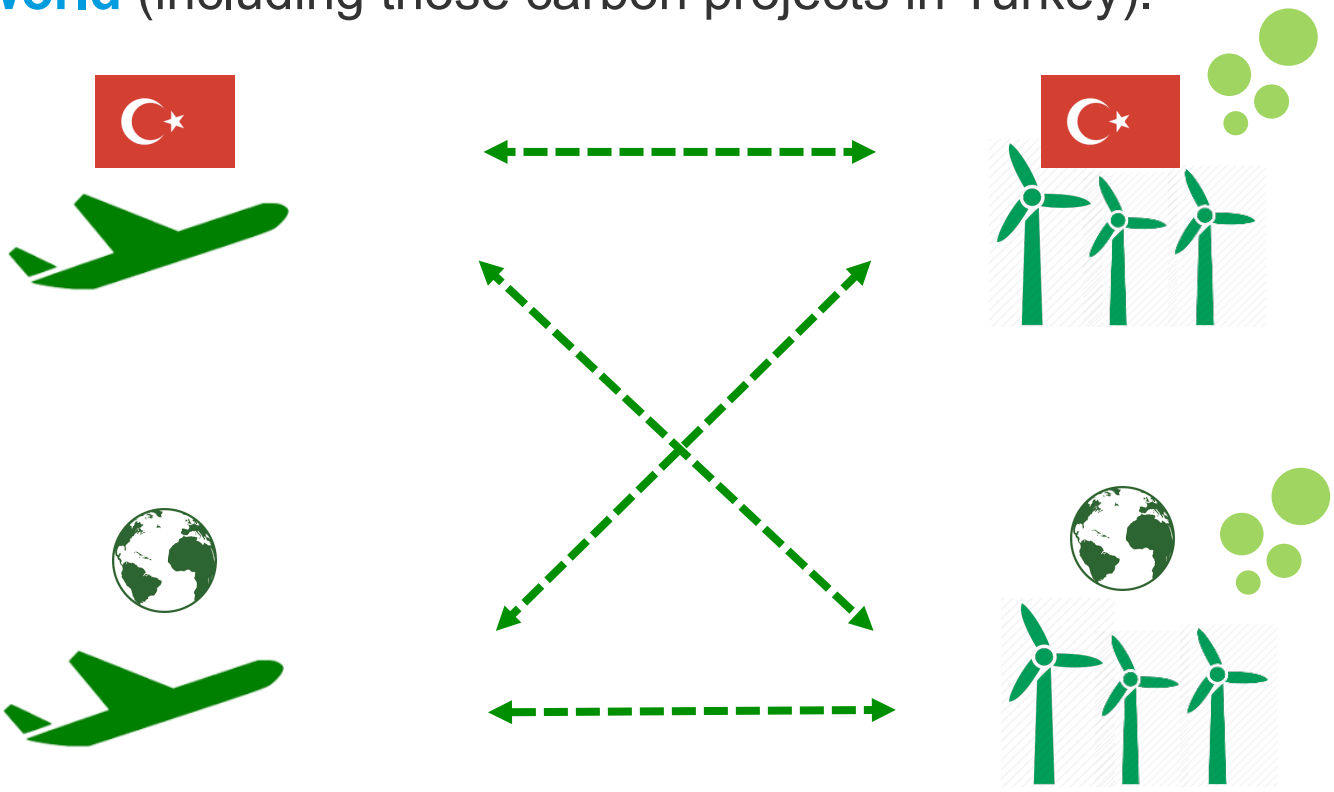

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1. International Supply and Demand Scenarios

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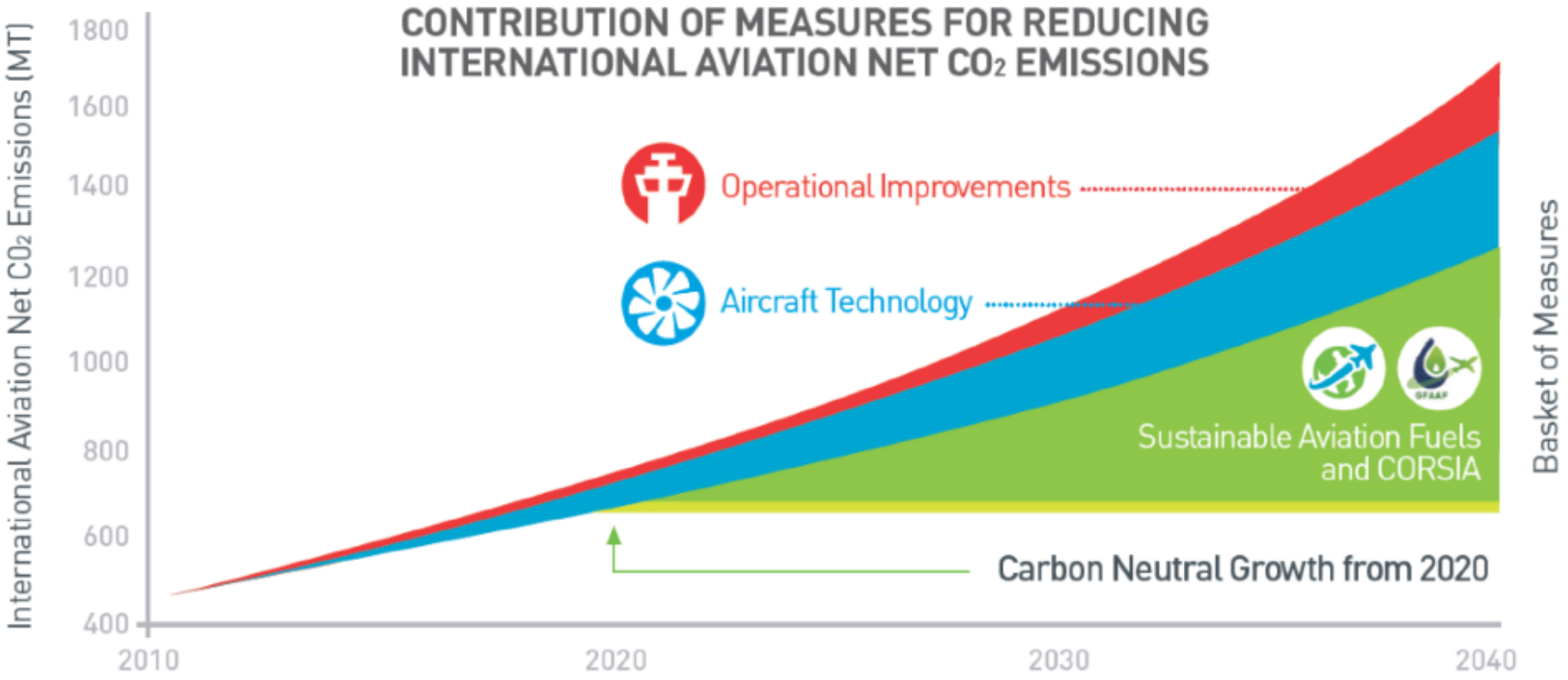
Basket of Measures



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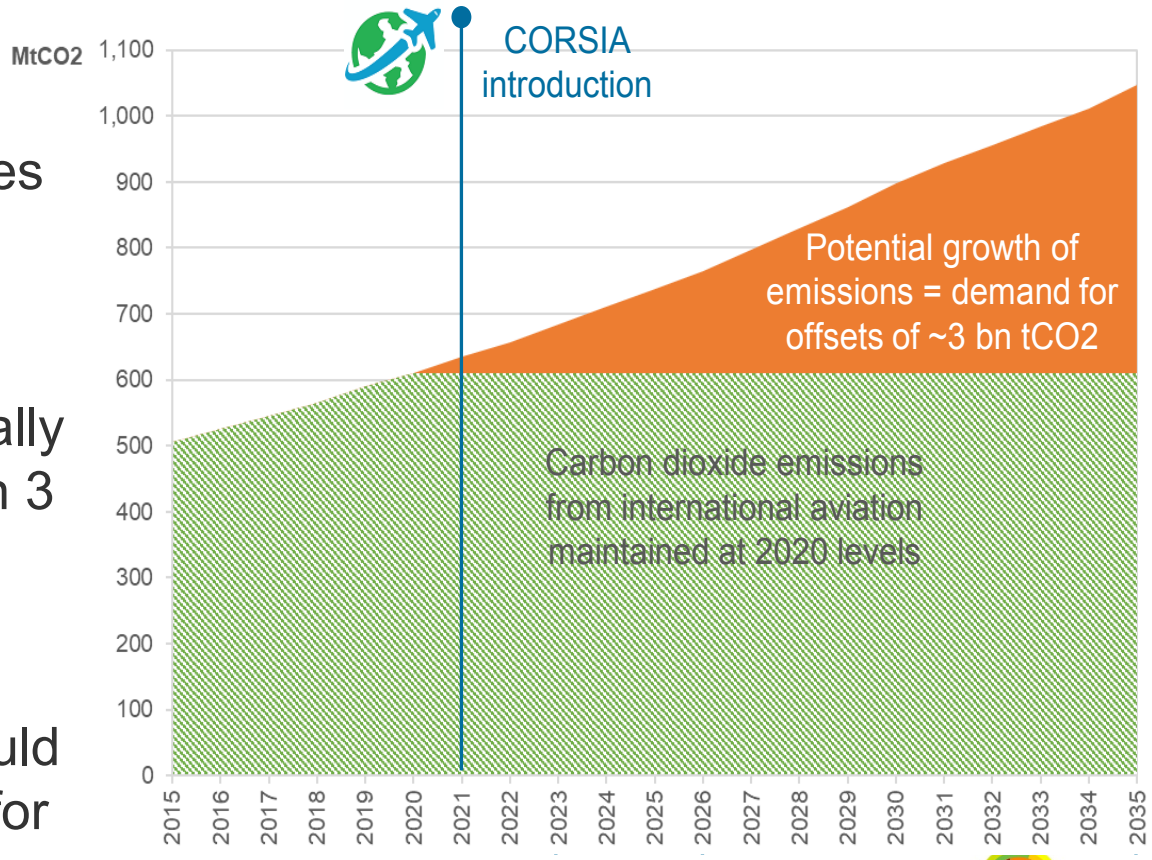
Potential International Demand for Offsets

- Demand depends on growth scenarios
- Forecast by ICAO indicates annual growth of 3% in international flights
- Several estimates, generally understood to be between 3 and 4 billion tCO2
- Possible extension of CORSIA beyond 2035 could further increase demand for offset credits



Source: NewClimate

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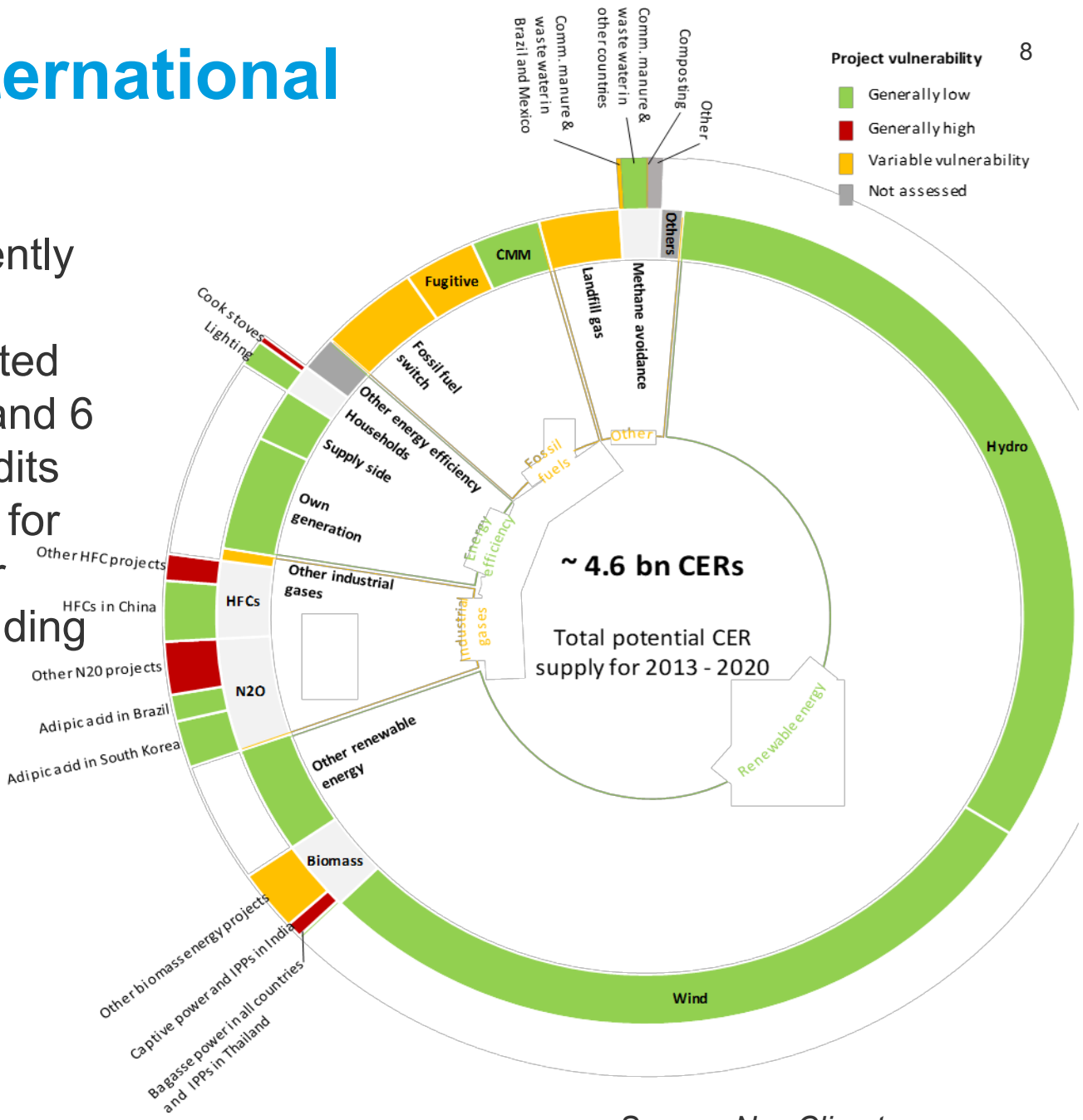
Potential International Supply

- Supply from currently registered carbon projects is estimated to be between 4 and 6 billion carbon credits
- Amount available for compliance under CORSIA is depending on eligibility requirements
- Restrictions considered will drastically reduce available amount



Source: NewClimate

2. Potential Demand for Offset Credits from Turkish Aircraft Operators

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ICAO offset requirement formula

An aircraft operator's offset requirement =

[% Sectoral **x** (an **aircraft operator's emissions** covered by CORSIA in a given year **x** the **sector's growth factor** in the given year)]

+

[% Individual x (an **aircraft operator's emissions** covered by CORSIA in a given year **x** that **aircraft operator's growth factor** in the given year)]

Share of **sectoral** and **individual**:

- from **2024-2026**: 100% sectoral and 0% individual
- from **2027-2029**, 100% sectoral and 0% individual
- from **2030-2032**, at least 20% individual
- from **2033-2035**, at least 70% individual

The sectoral growth rate will be determined by ICAO each year

Aviation Sector Turkey

More than **10 aircraft operators** in Turkey

- most passengers and cargo operators, some cargo only operators

International fuel consumption and associated CO_2 emissions from the Turkish Aviation Sector

Table: Fuel consumption and emissions Turkish aircraft operators on international flights

Year	International JET A1 Fuel Consumption (tonne)	Total International emissions (tCO_2)*
2014	4,052,756	12,806,709
2015	4,832,764	15,271,534

Source: DGCA

* 1 tonne of JET A1 fuel to 3.16 tCO_2e

Domestic Baseline Emissions Calculation (2019 – 2020)

Table: **CO_2 emissions growth rates** aviation sector under 3 growth scenarios

Growth scenario	Growth rate
Low	4%
Medium	8%
High	12%

Table: **Average CO2 emissions in baseline year** under 3 growth scenarios

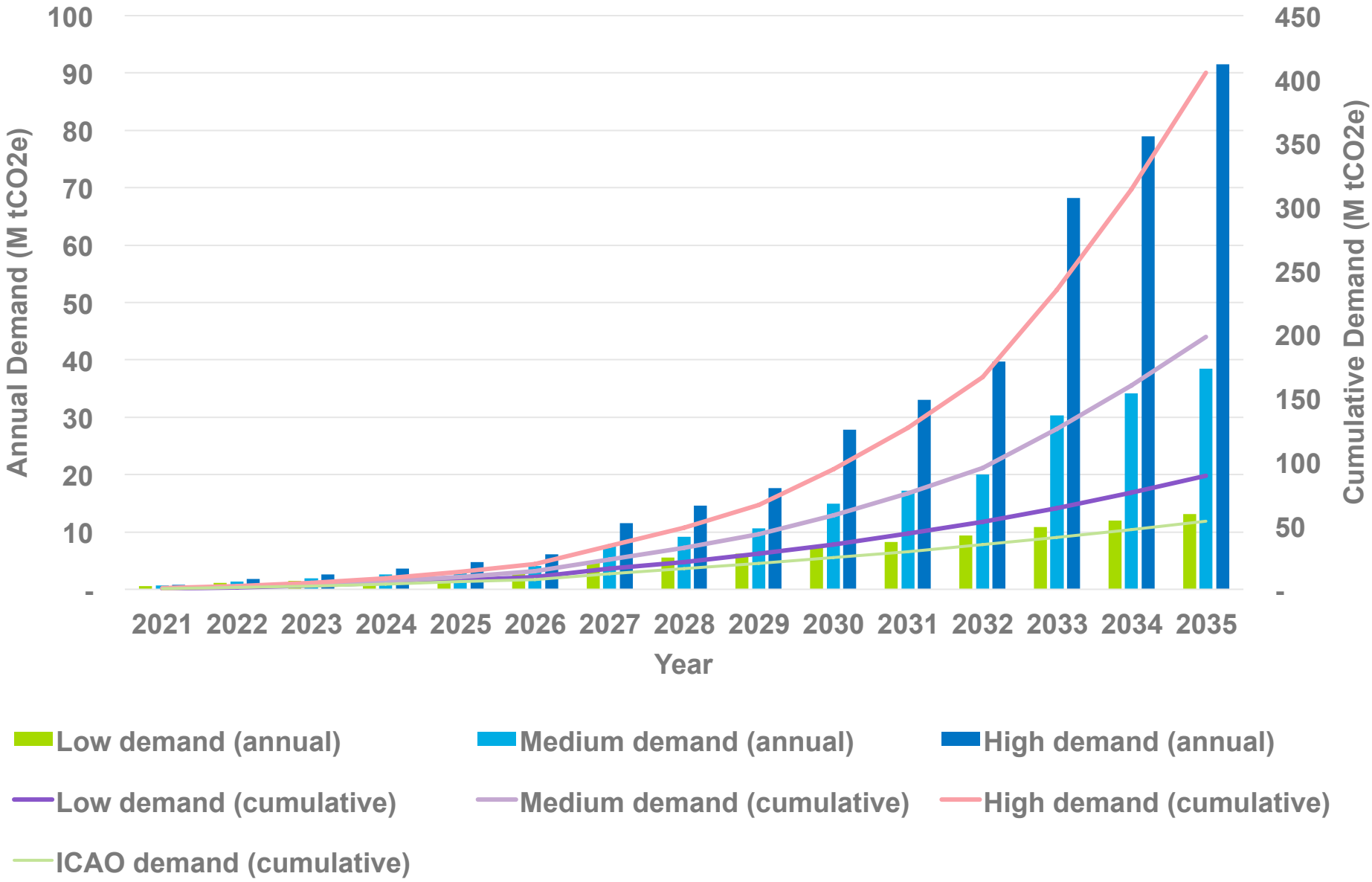
Growth scenario	Average 2019/2020 ($MtCO_2$)
Low	14.0
Medium	16.6
High	19.5

Source: DGCA

Estimated Demand for Offset from Turkish Aircraft Operators

Phase	Pilot Voluntary (total $MtCO_2$)	Phase 1 Voluntary (total $MtCO_2$)	Phase 2 Mandatory (total $MtCO_2$)	Total period (total $MtCO_2$)	Average Demand p/y ($MtCO_2$)
Years	*2021-2023*	*2024-2026*	*2027-2035*	*2021-2035*	-
Low	3.08	6.79	77.53	87.39	5.8
Medium	4.02	9.95	182.10	196.06	13.1
High	5.20	14.40	382.81	402.41	26.8
Medium ICAO	2.65	5.17	44.26	52.07	3.5

Estimated Demand for Offset Credits



3. Potential Supply of Offset Credits from current Turkish Carbon Projects

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Carbon Projects in Turkey

Model potential supply from Turkish Carbon Projects based on:

- currently registered project
- delivery potential based on historic delivery rates CDM
- Several scenarios have been considered

- 244 registered **projects**:
  - * 130 under the Gold Standard and
  - * 114 under VCS
- Mostly **hydro** power and **wind** power projects
- 39 projects are **financed by EBRD** under MidSEFF

Table: Overview of Turkish carbon projects by project type and installed capacities

Project Type	Installed Capacity (MW)
Hydro Power	5,188
Wind Power	3,629
Geothermal Power	104
Solar Power	7
Total	8,929

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Domestic Supply Scenarios: Modelled

1. **No Restrictions (base case):** all credits generated are eligible

2. **Project start date restrictions:** commit making expenditures
   a. **Post 2012** – start 3rd trading period EU-ETS, introduction of some restrictions, which CORSIA may want to apply

   b. **Post 2016** – Passing of ICAO CORSIA Resolution A39-3 (adoption of CORSIA)

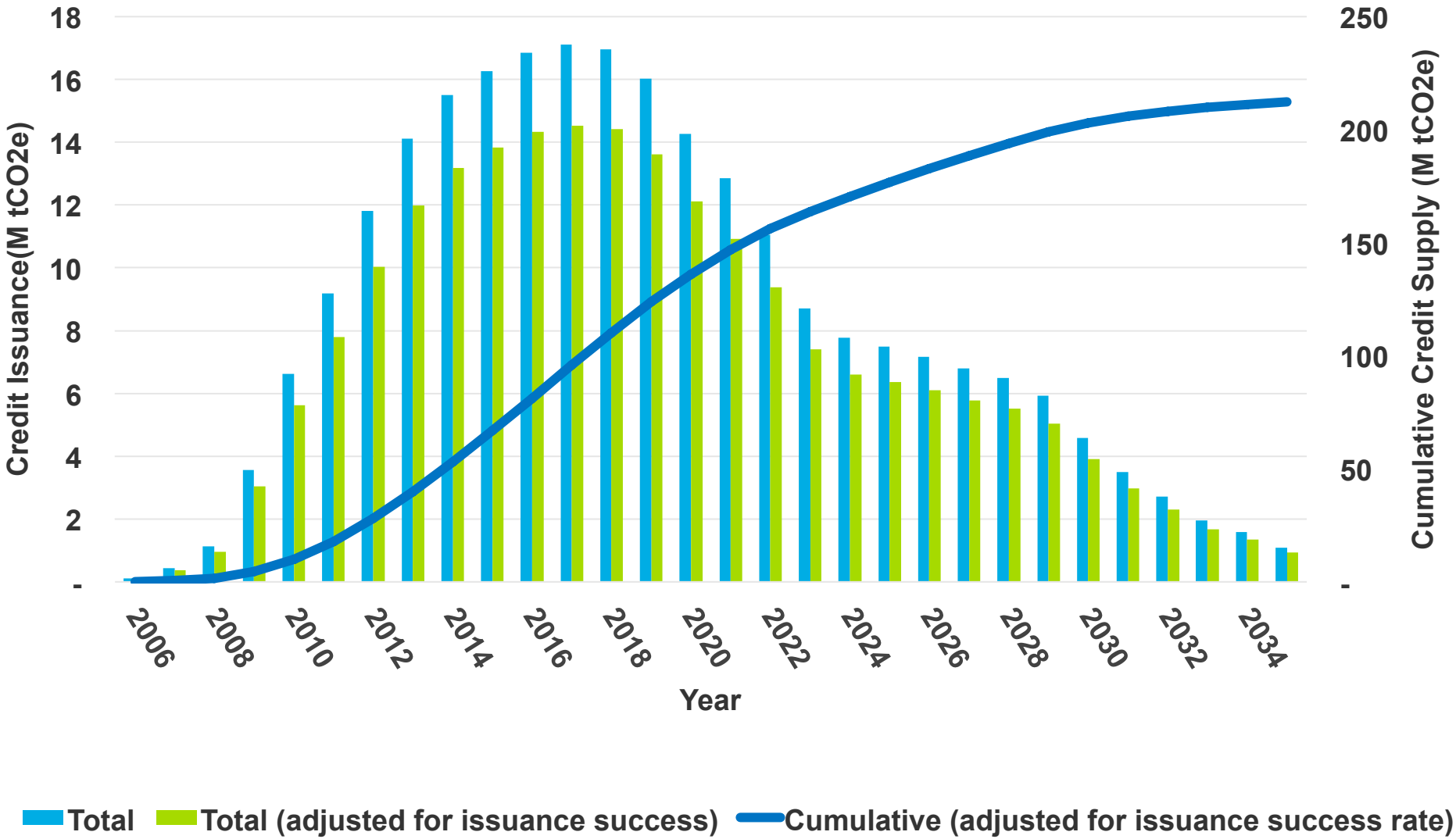
3. **Vintage year restrictions:** year of generation of credits
   a. Post 2012 – same as above

   b. Post 2016 – same as above

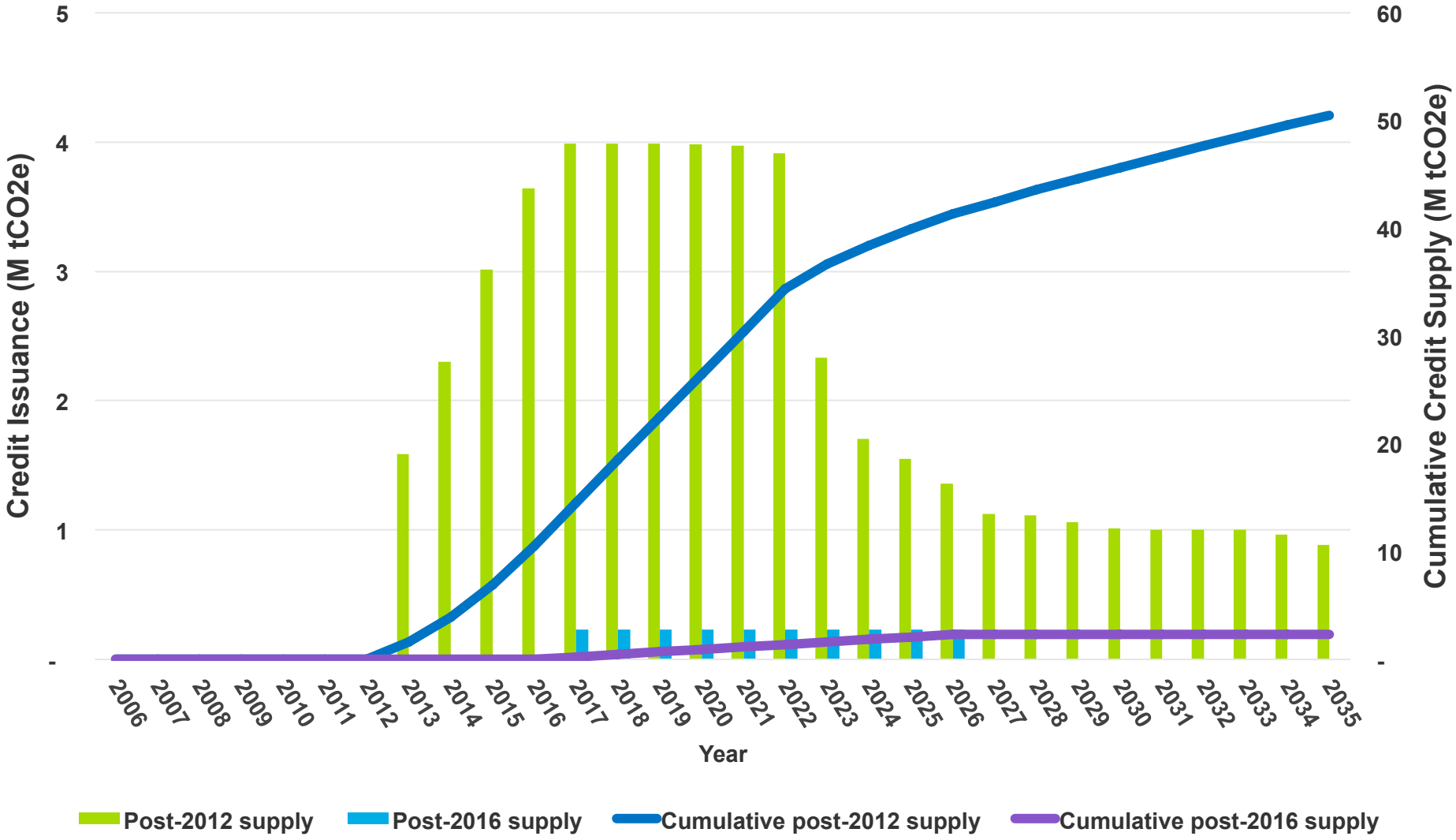
4. **Project Type Restrictions:** some types of projects not eligible, such as large hydro, HFC-23, forestry or other projects

5. **Standard Restrictions:** VCS, Gold Standard, UNFCCC-CDM, CAR

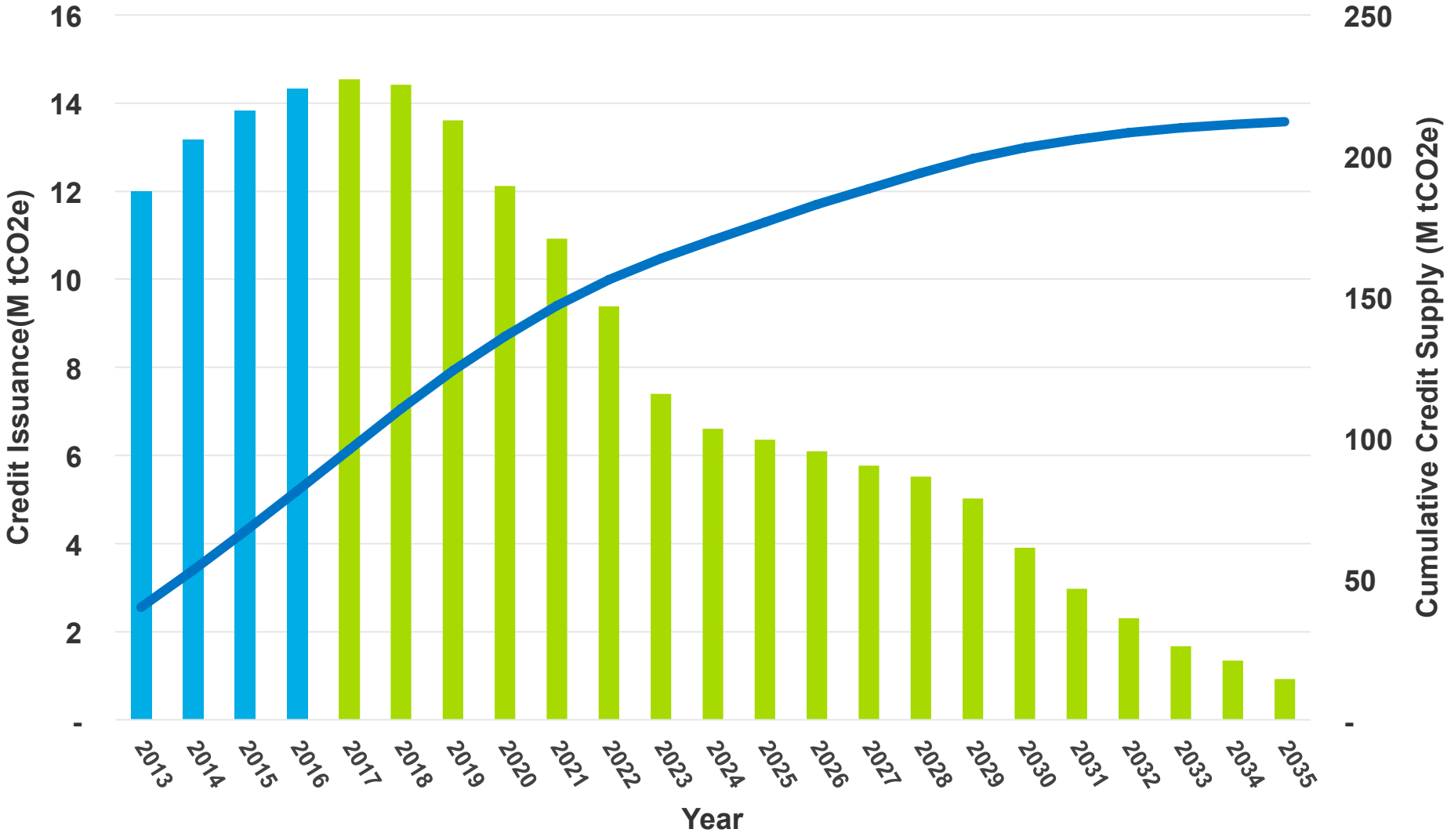
No Restrictions



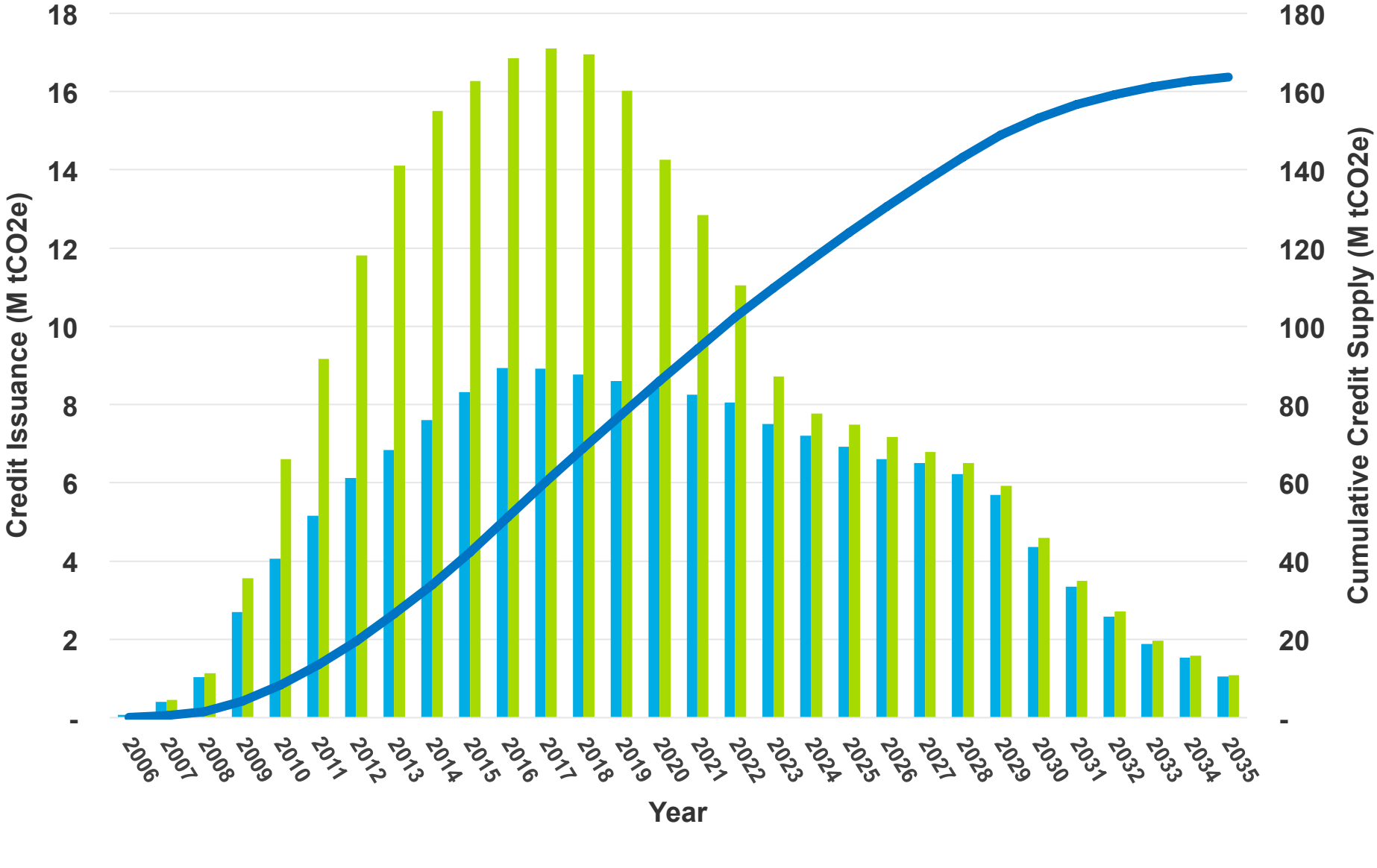
Project Start Date Restrictions



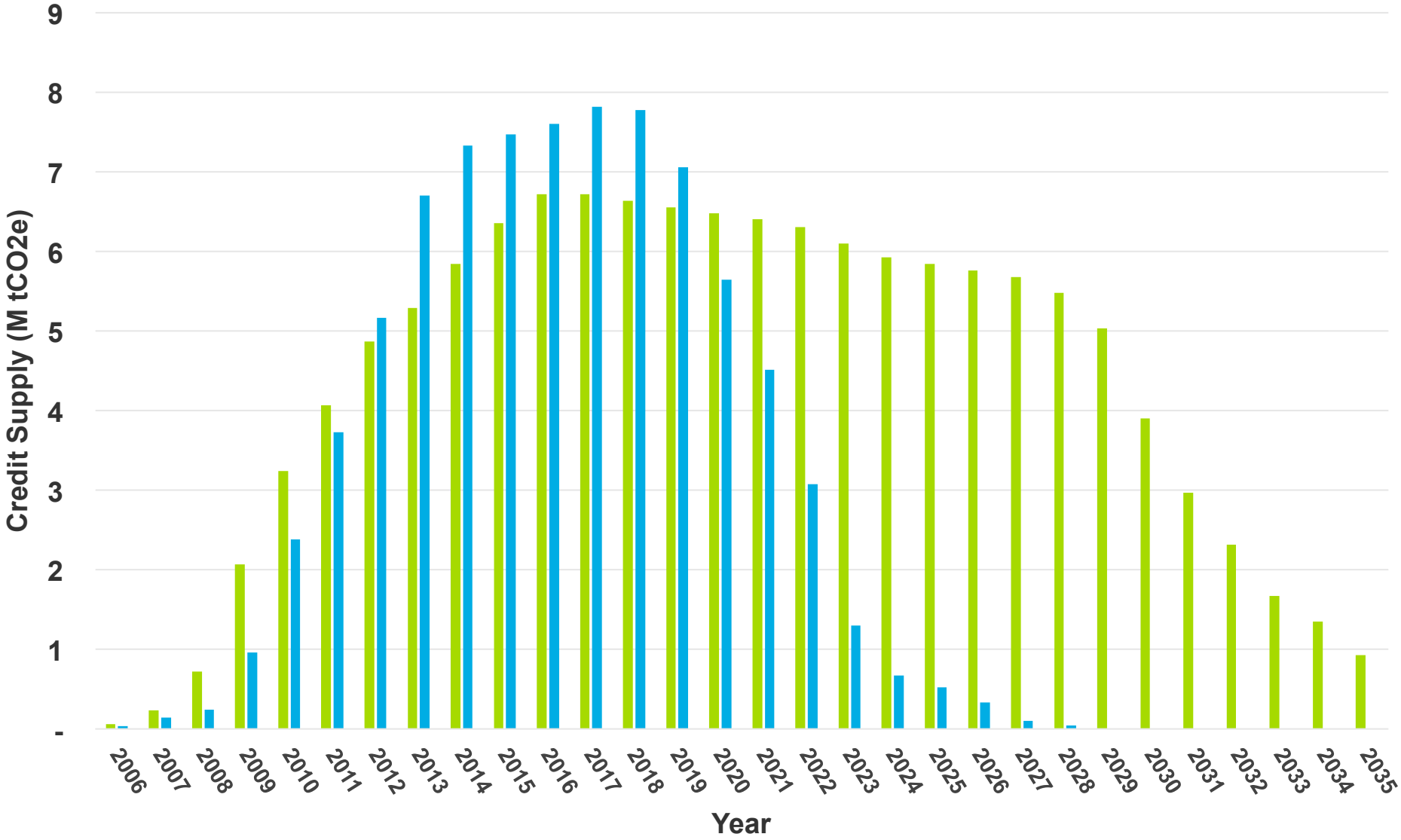
Vintage Year Restrictions



Project Type Restrictions



Carbon Standard Restrictions



Summary of Eligibility Scenarios for Turkish Carbon Credit Supply under CORSIA

Scenario	Type	Pre-2021 carbon credit supply	Cumulative supply by 2035
Scenario 1	No restrictions	135 $MtCO_2e$	212 $MtCO_2e$
Scenario 2	Project start date restrictions	26 $MtCO_2e$	50.5 $MtCO_2e$
Scenario 3	Vintage year restrictions	135 $MtCO_2e$	212 $MtCO_2e$
Scenario 4	Project type restrictions	86 $MtCO_2e$	163 $MtCO_2e$
Scenario 5	Carbon standard restrictions	135 $MtCO_2e$	212 $MtCO_2e$

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